SNAP-IN PANEL DESIGN FOR A REFRIGERATION COOLER

BACKGROUND OF THE INVENTION

[0001] This invention relates to an insulated refrigeration panel assembly for an insulated cooling structure, such as a walk-in cooler, a refrigerated display cabinet, a beverage cooler and other insulated structure.

[0002] Refrigerated goods are typically stored in an insulated space prior to their use or consumption. Such a space, such as offered by a walk-in cooler, may be erected and/or constructed on-site from a number of panels. For example, a walk-in cooler is typically constructed from insulated refrigeration panels. Each insulated refrigeration panel has an inner and outer skin. These skins sandwich an insulated foam, such as urethane. The inner and outer skins provide a smooth surface for cleaning while the insulating foam serves to keep goods cool.

[0003] The insulated refrigeration panels may form the walls, the ceiling and the floor of the insulated space. For a walk-in cooler, the various wall, ceiling and floor panels are brought to the job site, erected, and then assembled using fasteners to attach the panels together. The fastening of these panels is both time consuming and costly. It is therefore desirable to eliminate the need for fasteners and to reduce the amount of time required to assemble these insulated refrigeration panels together.

[0004] One particular panel design eliminates the need for fasteners between panels by allowing the panels to be joined by a snap-fit connection at the end of each panel. Accordingly, each panel is inserted to another panel from end to end to

create the walls or roof of the cooler. This design eliminates the need for separate fasteners.

[0005] These existing snap-fit panels are produced on a conveyor belt in sections. Because these panels are produced in this fashion, the snap-fit connectors are located only at the ends of the panel. Due to this limitation, the number of structural configurations that may be made from these snap-fit panels is also thereby limited.

[0006] A need therefore exists for an insulated refrigeration panel assembly that offers the convenience of a snap-fit connector without the limitation of the foregoing design.

SUMMARY OF THE INVENTION

[0007] The present invention comprises an insulated refrigeration panel assembly that offers a greater variety of panel configurations than existing designs. Like existing panel assemblies, the inventive insulated refrigeration panel has two skins that sandwich an insulating foam. In contrast to existing designs, however, integrated snap fit connectors permit connection of one panel to another panel not only along the panel but also across the panel. In this way, a single panel may be connected to two panels: one panel that fits end-to-end and another panel that intersects the other panel. Further, panels may engage one another in both a vertical and horizontal direction. Accordingly, a greater variety of structural configurations are available for the design of an insulated space.

[0008] The insulated refrigeration panel assembly has a first skin and a second skin spaced generally parallel to the first skin. The skins sandwich an

insulating body, such as a urethane foam. A first snap-fit connector allows flexible engagement of a mating connector along one direction while a second snap-fit connector allows flexible engagement of a second mating connector along another direction. The snap-fit connectors are formed by the panels themselves, i.e., skins and insulating body, rather than by any separate connector. In this way, assembly time of the insulated space is greatly reduced because there is no need to install separate connectors to attach one panel to another.

[0009] The snap-fit connector may have features that allow flexing between two different dimensions. One dimension of the snap-fit connector allows a mating connector to be received while the other dimension locks the two connectors together.

[0010] Like the snap fit connector, the mating connector may be an integrated part of a panel or may be just another insulating body. This second insulating body may have a first end portion and a second end portion. The first end portion fits within the snap-fit connector while the other end portion may allow another snap-fit connector to fit over. Accordingly, the mating connector may serve to join two of the same type of snap-fit connectors. A flange may be attached to the second insulating body that covers a joint between two panels. The flange may be curved. This flange serves to cover the seam between panels to facilitate clean-up of the refrigerated panels and prevent the collection of food between panels.

[0011] A panel may comprise two distinct bodies. One body may define part of the snap-fit connector while the other body may define the other part of the snap-fit connector. The snap-fit connector may further be a female member engageable to a mating connector, such as a male member which is insertable into the

female member. The female member may flex between a first dimension larger than a second dimension to receive the male member. The male member may then be engaged to the female member when in the second dimension.

[0012] The inventive panel assembly may thus be constructed from three different panels, each comprising two skins sandwiching an insulating body. A single panel may be connected to two others in two different directions. In addition, the inventive refrigerated panel assembly permits another panel to intersect the single panel.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The various features and advantages of this invention will become apparent to those skilled in the art from the following detailed description of the currently preferred embodiment. The drawings that accompany the detailed description can be briefly described as follows:

[0014] Figure 1 illustrates a plan view of the inventive insulated refrigeration panel assembly.

[0015] Figure 2 illustrates a snap-fit connector prior to insertion of a mating connector.

[0016] Figure 3 illustrates the insertion of the mating connector into the snap-fit connector of Figure 2.

[0017] Figure 4 illustrates the mating connector completely inserted into the snap-fit connector.

[0018] Figure 5 illustrates the panel of Figures 1-4 attached to another panel with a mating connector.

[0019] Figures 6A-6C illustrates various mating connectors.

[0020] Figure 7 illustrates panels constructed from two distinct bodies to form snap-fit connectors.

[0021] Figure 8 illustrates panels forming an insulated refrigeration space.

[0022] Figure 9 illustrates one panel simply intersecting another panel with the inventive features.

[0023] Figure 10 illustrates a method of constructing the inventive insulated refrigeration panels.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0024] Figure 1 illustrates inventive refrigeration panel assembly 10. Here, panel assembly 10 is made from three panel units: first panel unit 20, second panel unit 80, and third panel unit 120. First panel unit 20 has first skin 24 spaced generally parallel along the X-axis to second skin 28. First insulating body 32 is sandwiched between the two skins 24, 28. In contrast to existing wall panel assemblies, first panel unit 20 is made by placing panel skins 24 and 28 in a press with a foam, such as a urethane foam, shot between the two skins 24, 28. The urethane foam may have a density of two pounds per cubic foot. Because first panel unit 20 is constructed by a press rather than a conveyor operation, first panel unit 20 may have two snap-fit connectors: first snap-fit connector 36 is constructed to receive a mating connector along the Y-axis while second snap-fit connector 44 is constructed to receive a mating connector along the X-axis. Axes X and Y are transverse to each other.

[0025] Accordingly, first panel unit 20 may flexible engage mating connectors in two different directions. One direction may be horizontal while the other direction may be vertical, for example. This increased freedom of engagement allows first panel unit 20 to be used for the construction of a wall to wall corner, a ceiling and wall corner, or a floor and wall corner.

[0026] Second panel unit 80 is constructed in like fashion to first panel unit 20. Third skin 84 and fourth skin 88 sandwich second insulating body 92, a urethane foam, and may form an integral first mating connector 40 that may be received in a snap-fit fashion by first snap-fit connector 36. Second panel unit 80 may have a snap-fit connector on the other end or alternatively another mating connector depending upon the particular configuration desired.

[0027] Likewise, third panel unit 120 has fifth skin 124 spaced generally parallel from sixth skin 128. A urethane insulating foam forms third insulating body 132. Fifth skin 124 and sixth skin 128 and third insulating body 132 form second mating connector 48 to be received by second snap-fit connector 44. Third panel unit 120 may also have another snap-fit connector on its other end or another mating connector. As shown in Figure 1, first panel unit 20 may receive second panel unit 80 in the direction of arrow V along the Y-axis and receive third panel unit 120 in the direction of arrow H along the X-axis in a snap-fit fashion.

[0028] The snap-fit connection will now be explained. Figure 2 illustrates how first snap-fit connector 36 may flexibly engage with first mating connector 40. As shown, first snap fit connector 36 comprises a female member sized to mate with first mating connector 40, here a male member that is inserted along the direction of arrow Y into the female member. As mating connector 40 moves in the direction of

arrow V along the Y-axis into first snap-fit connector 36, mating connector 40 will encounter first flexible portion 22 and second flexible portion 26. First flexible portion 22 and second flexible portion 26 each comprise a gasket or sponge placed between insulating body 32 and second skin 28. The space between first flexible portion 22 and second flexible portion 26 has dimension D_2, which is smaller than the outer width W_0 of mating connector 40. Accordingly, as mating connector 40 is inserted into snap-fit connector 36, as shown in Figure 3, mating connector 40 causes first flexible portion 22 and second flexible portion 26 to retreat in the direction of arrows A and B, respectively, to cause opening 37 to expand from dimension D_2 to dimension D_1, which is the same dimension as width W_0 of first mating connector 40. Once first mating connector 40 is completely received within opening 37 of first snap fit connector 36, first flexible portion 22 and second flexible portion 26 spring back to their original form as shown in Figure 4 to thereby engage or lock first mating connector 40 to first snap-fit connector 36. In this fashion, each snap-fit connector may engage with each mating connector.

[0029] As further shown in Figure 4, second panel unit 80 may form a wall of a walk-in cooler or other refrigeration space while first panel unit 20 may form a top panel. In the event that second panel unit 80 is located on floor 66, second insulating body 52 may be used to fill another snap-fit connector 57 and provide a better foundation on floor 66. As shown, a joint or seam 76 is formed between floor 66 and second panel unit 80. Flange 64, having a curved portion, may cover joint/seam 76. Flange 64 prevents debris from collecting between panels and presents a rounded corner to facilitate cleaning.

[0030] As shown in Figure 5, alternatively, rather than placing second panel unit 80 on floor 66, second panel unit 80 may intersect another panel unit, here floor panel unit 136, which is constructed in like fashion as the other panel units. Rather than use second insulating body 52, another insulating body 54 having first end portion 56 to mate with snap-fit connector 57 is provided as well as second end portion 60 to mate with another snap-fit connector 59. In this way, wall panel assembly 80 may be flexibly engaged to floor panel unit 148.

[0031] Figures 6A-6C illustrate in a close-up view of each of the unique insulating bodies used with snap-fit connector 57. Figure 6A and 6B illustrate a close-up view of insulating body 54. The only difference between Figure 6A and Figure 6B is the type of flange employed. Figure 6A has flange 64 and flange 65. Flange 64 has first portion 68 to receive second panel unit 80 as well as second portion 72, here a curved surface, to cover joint 76. Flange 65 merely has first portion 68. Figure 6B illustrates insulating body 54 having two of the same flanges, here flange 64. Figure 6C illustrates insulating body 52 of Figure 4 having flange 64.

[0032] As shown in Figure 7, panel units may be formed in sections. Here, top panel unit 152 comprises first body 156 and second body 160. First body 166 is pressed into second body 160 at border 164 in the direction of arrow H. Similarly, second bottom panel unit 164 has third body 168 and fourth body 172. Fourth body 172 is pressed into third body 168 at border 164 in the direction of arrow H as well. Because second body 160 is pressed into first body 156, snap-fit connector 166 may still flexibly engage first mating connector 40 of second panel unit 80. Similarly, because fourth body 172 is pressed into third body 168, snap fit connector 176 may engage insulating body 54 in a snap-fit fashion.

[0033] Figure 8 illustrates the increased construction flexibility offered by this particular design. This design permits panel units to be constructed in shorter lengths. Accordingly, rather than employ a single panel unit having a length L as shown in Figure 8, four panel units 200, 202, 204 and 206, may all be snap-fit together to form length L. Having shorter panel lengths facilitates the manufacturer of these panel units in a press.

[0034] As shown in Figure 9, top panel unit 180 may be provided with only a single snap-fit connector 36 to receive panel unit 80, here a wall panel, while floor panel 184 may have a single snap-fit connector 210 to receive insulating body 54. Such a design may be used to define the wall ends of a walk-in cooler.

[0035] As shown in Figure 10, a panel unit is constructed by a press, here press 218. Press 218 is constructed from known designs and has moveable press 220, which may be moved toward press table 224 in the direction of arrow P. As shown, first skin 24 and second skin 28 are spaced generally parallel from each other within press 218. Spacers 230, 232, 234 and 236 are used to define the space between first skin 24 and second skin 28. Cavity 222 is defined by spacers 230, 232, 234 and 236 as well as by first skin 24 and second skin 28. In addition, first flexible portion 22 and second flexible portion 26 are placed in their proper positions in cavity 222. Foam injector 228 then sprays foam 240, here a urethane foam, into cavity 222 and fills cavity 222 under pressure from moveable press 220 as applied in the direction of arrow P. Once foam 240 has dried and hardened, press 220 is moved in the direction of arrow Q and spacers 230, 232, 234, and 236 are removed from completed panel unit 220.

[0036] While the foregoing designs are shown primarily in a top panel, wall panel and floor configuration, the invention encompasses the use of these panels in other configurations requiring an insulated panel assembly. Indeed, the aforementioned description is exemplary rather that limiting. Many modifications and variations of the present invention are possible in light of the above teachings. The preferred embodiments of this invention have been disclosed. However, one of ordinary skill in the art would recognize that certain modifications would come within the scope of this invention. Hence, within the scope of the appended claims, the invention may be practiced otherwise than as specifically described. For this reason the following claims should be studied to determine the true scope and content of this invention.